UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,503	01/05/2001	Nancy E. Miller	BA4-067	5241

21567 7590 01/07/2005

WELLS ST. JOHN P.S.
601 W. FIRST AVENUE, SUITE 1300
SPOKANE, WA 99201

EXAMINER	
PHAM, HUNG Q	
ART UNIT	**PAPER NUMBER**
2162	

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/755,503	MILLER ET AL.	
	Examiner	Art Unit	
	HUNG Q PHAM	2162	

-- The MAILING DATE f this communicati n appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34,36-50,53-65,67,68 and 71-75* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34,36-50,53-65,67,68 and 71-75* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

- Applicant's arguments with respect to the steps of ***inputting a plurality of query objects into a data processing device***, and ***the relative relationships between each of the plurality of query objects and the items of the body of data*** of claims 1, 17, 49 and 65, from page 2 to page 29, 32 and 33, have been fully considered but they are not persuasive because of the following reasons.

As shown in FIG. 9, a query can be treated as a document, and projected into the same subspace. The distances between the query and other documents are measured by using the cosine measure, for example, to determine the best matches. At block 220 where a query frequency vector is computed by tokenizing the query and applying term normalization and stemming policies that were used on the original collection (Col. 14, Lines 12-22). The terms are tokenized according to a tokenizing policy, e.g., sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes, whatever is needed to capture the important terms in the particular domain or the application (Col. 10, Lines 8-12). As illustrated at FIGS. 11 and 12, a user interface could be provided to make it easy for the user to select terms for querying (Col. 15, Lines 28-29). As seen, via a user interface for selecting terms, a query with a plurality of terms is projected for tokenizing to identify the features such as sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes in order to apply term normalization and stemming policies

for comparing with the documents in documents collection 110 of FIG. 3. In other words, the technique of projecting the query via a user interface performs the claimed ***inputting a plurality of query objects into a data processing device.***

Returning to FIG. 9, the similarity is determined by measuring the distance between the query and the documents by using the cosine (Col. 14, lines 28-31). As shown in FIG. 15 is the results of a query for the term `Apache`. For this query, only Document A, C, and E have non-zero scores. Therefore, only these three documents are returned (Col. 17, Lines 35-41). As shown in FIG. 20, an example of a query with three terms `module`, `fuselage`, and `pounds` is illustrated. As seen, the similarity as ***the relative relationships between each term as query object and the documents of the document collection*** is determined. In different word, the technique as discussed performs the step of ***determining relative relationships between each of the plurality of query objects and the items of the body of data.***

- In response to applicant's argument that there is no suggestion to combine the references with respect to claims 5 and 65 at pages 29 and 33, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Herz

teaches a method of clustering target objects. Herz further discloses a threshold distance t for displaying the most interesting objects, wherein t is chosen to be a function of cluster diameter of a cluster C (Herz, Col. 68, lines 36-56). Thus, a threshold as taught by Herz to narrow down the result to the closet documents that match the queries for displaying is a must for Billheimer technique.

- Applicant's arguments with respect to the steps of ***displaying at least a majority of the rays to have a common origin*** of claim 33 at page 31 have been fully considered but they are not persuasive because the obviousness as set forth in the rejection of claim 33 is based on the suggestion of the prior art. As illustrated at FIG. 20, three axes as ***a majority of the plurality of rays*** representing the queries: "fuselage", "module", and "pounds", obviously, has ***a common origin*** as shown.

- As argued by applicant at pages 31 and 32:

More specifically, Billheimer already positively discloses visualization of a single query and documents in a 3D space. Accordingly, Billheimer already positively discloses the alleged motivational rationale presented for the proposed modification of Billheimer and it follows that the alleged motivation identified by the examiner is deficient.

...

Also, it is alleged on pages 10-11 of the Office Action that is obvious to modify the teachings of Billheimer in support of the 103 rejection in order to represent a result of two different query terms in the same document. Applicants disagree. Initially, Billheimer is directed towards illustrating a single query and is not concerned with representing plural queries. Apart from improper reliance upon Applicant's disclosure, there is no motivation to modify

Billheimer to display or represent plural queries and accordingly any reliance upon the same to support further modification of Billheimer to arrive at Applicants' claimed invention is improper...

Examiner respectfully traverses because Billheimer discloses visualization of a plurality of queries such as "fuselage", "module", and "pounds" as illustrated at FIG. 20, and the obviousness as set forth in the rejection of claim 33 is based on the suggestion of the prior art as discussed above with respect to FIG. 20.

- In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Claim Objections

Claim 71 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in indep ndent form.

As in claim 71, the step of ***determining a critical distance from the common origin, wherein points on the plurality of rays falling within the critical distance meet or exceed a relevancy threshold and points on the plurality of ray outside the critical distance do not meet the relevancy threshold*** was recited in independent claim 65.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 17, 73 and 75 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claims 1 and 17, the step of ***displaying a second point representing the same specific item at a second position along another one of the rays*** was not described in the specification.

Regarding claim 73, the step of ***associating the points representing the same specific item and positioned along the different rays with one another*** was not described in the specification.

Regarding claim 75, the step of ***simultaneously displaying the points representing the same specific item*** was not described in the specification.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 49 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As set forth in MPEP 2106 (IV) (A):

> *35 U.S.C. 101 defines four categories of inventions that Congress deemed to be the appropriate subject matter of a patent; namely, processes, machines, manufactures and compositions of matter. The latter three categories define "things" while the first category defines "actions" (i.e., inventions that consist of a series of steps or acts to be performed). See 35 U.S.C. 100(b) ("The term 'process' means process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.").*

A ***computer data signal embodied in a transmission medium*** as recited in claim 49 is not an appropriate subject matter of patent as defined by 35 U.S.C 101. Applicant is

required to amend the claim(s) to place the claim(s) in one of four defined categories as set forth above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6-9, 11-12, 14, 16-20, 22-25, 27, 28, 30, 32-34, 36, 38-41, 43, 44, 46, 48-50, 54-57, 59, 61-63 and 72-75 are rejected under 35 U.S.C. 103(a) as being unpatentable ov r Billheimer et al. [USP 6,611,825 B1].

Regarding claims 1 and 17, Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Col. 4, lines 35-48). As shown in FIG. 2 is ***an image device configured to provide a visual image; and digital processing circuitry coupled with the image device*** (Col. 8, line 49-Col. 9, line 6). As shown in FIG. 9, a query can be treated as a document, and projected into the same subspace. The distances between the query and other documents are measured by using the cosine measure, for example, to determine the best matches. At block 220 where a query frequency vector is computed by tokenizing the query and applying term normalization and stemming policies that were used on the original collection (Col. 14, Lines 12-22). The terms are tokenized according to a tokenizing policy, e.g., sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes, whatever is needed to capture the important terms in the particular domain or the application (Col. 10, Lines 8-12). As illustrated at FIGS. 11 and 12, a user interface could be provided to make it easy for the user to select terms for querying (Col. 15, Lines 28-29). As seen, via a user interface for selecting terms, a query with a plurality of terms is projected for tokenizing to identify the features such as sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes in order to apply term normalization and stemming policies for comparing with the documents in documents collection 110 of FIG. 3. In other words, the technique of projecting the query and tokenizing performs the claimed ***a plurality of query objects***; and ***identifying features within each of the plurality of query objects that allow comparison to items of a body of data stored in a database***. Returning to FIG. 9, the similarity is

determined by measuring the distance between the query and the documents by using the cosine (Col. 14, lines 28-31). As shown in FIG. 15 is the results of a query for the term `Apache`. For this query, only Document A, C, and E have non-zero scores. Therefore, only these three documents are returned (Col. 17, Lines 35-41). As shown in FIG. 20 is an example of a query with three terms `module`, `fuselage`, and `pounds`. As seen, the similarity as the relative relationships between each term as query object and the documents of the document collection is determined. In different word, the technique as discussed performs the step of ***determining relative relationships between each of the plurality of query objects and the items of the body of data***. As shown in FIG. 11, in order to visualize the mining technique, the axes that correspond to a query is generated as user request (Col. 14, line 57-Col. 16, line 3). Assuming the user entered `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 performs the claimed ***displaying points along a plurality of rays, wherein a position of each of the displayed points corresponds to the determined relative relationship between each respective one of the plurality of query objects and the body of data, wherein a ray is provided for each query object***; ***displaying a point representing a specific one of the items at a first position along one of the rays, which position indicates a determined relative relationship between the item and the ray's query object, and displaying a second point at a second position along another one of the rays, which second position indicates a determined relative relationship between the item and the second ray's query object***. Billheimer does not explicitly teach the ***second point representing the same specific item***. However, for a document that has terms "apache" and

"rotorcraft", and with two queries "apache" and "rotorcraft" as discussed above, two rays will be provided for "apache" and "rotorcraft", and obviously, there will be two points represent the same document, one will be along the apache ray at a position based on cosine distance, and another point along rotorcraft ray also based on cosine distance as ***second point representing the same specific item***. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer technique by displaying two points represent for the same item at two different rays for two queries in order to represent a result of two different query terms contain in the same document.

Regarding claim 33, Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Col. 4, lines 35-48). Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Col. 4, lines 35-48). As shown in FIG. 9, a query can be treated as a document, and projected into the same subspace. The distances between the query and other documents are measured by using the cosine measure, for example, to determine the best matches. At block 220 where a query frequency vector is computed by tokenizing the query and applying term normalization and stemming policies that were used on the original collection (Col. 14, Lines 12-22). The terms are tokenized according to a tokenizing policy, e.g., sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes, whatever is needed to capture the important terms in the particular domain or the application (Col. 10, Lines 8-

12). As seen, a query with a plurality of terms is projected for tokenizing to identify the features such as sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes in order to apply term normalization and stemming policies for comparing with the documents in documents collection 110 of FIG. 3. In other words, the technique of projecting the query and tokenizing performs the claimed ***identifying features within each of the plurality of query objects that allow comparison to a body of data stored in a database***. The logic then moves to block 226 where the similarity as ***relative relationships*** is determined by measuring the distance between the query and the documents by using the cosine (Col. 14, lines 28-31) as the step of ***determining relative relationships between each of the plurality of query objects and the body of data***. The top ranked documents in terms of closeness are then returned as best matches to the query (Col. 14, lines 31-34). As shown in FIG. 11, in order to visualize the mining technique, the axes that correspond to a query is generated as user request (Col. 14, line 57-Col. 16, line 3). Assuming the user entered `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines 11-27), a legend is generated for the axes. The legend consists of one or more words attached to one or both directions of the dimension. This indicates to the user that documents near one end of the dimension tend to contain the words at that end or words correlated with those words in the document set (Col. 15, lines 52-59). As shown in FIG. 20 is example of visualization with a plurality of projected points corresponding to documents with three rays `module`, `fuselage`, and `pounds` corresponding to the queries, wherein the documents near the end of the ray tend to contain the query word

based on the similarity as ***relative relationships*** determined by measuring the distance between the query and the documents. In other words, the technique as discussed performs the claimed ***control an image device to depict points corresponding to data from the database along each of a plurality of rays, wherein positions of the displayed points correspond to the relative relationships***. Billheimer does not explicitly teach the technique of ***displaying at least a majority of the plurality of rays to have a common origin***. However, three axes as ***a majority of the plurality of rays*** representing the queries: "fuselage", "module", and "pounds", obviously, has ***a common origin*** as disclosed at FIG. 20. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to include a common origin for a plurality of axes in order to visualize a set of queries and the retrieved document in a three dimensional space.

Regarding claim 49, Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Col. 4, lines 35-48). Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Col. 4, lines 35-48). As shown in FIG. 9, a query can be treated as a document, and projected into the same subspace. The distances between the query and other documents are measured by using the cosine measure, for example, to determine the best matches. At block 220 where a query frequency vector is computed by tokenizing the query and applying term normalization and stemming policies that were used on the original collection (Col. 14, Lines 12-22). The terms are tokenized according to a tokenizing policy, e.g., sequences of letters, letters and numbers, or

letters, numbers and certain punctuation like hyphens or slashes, whatever is needed to capture the important terms in the particular domain or the application (Col. 10, Lines 8-12). As seen, a query with a plurality of terms is projected for tokenizing to identify the features such as sequences of letters, letters and numbers, or letters, numbers and certain punctuation like hyphens or slashes in order to apply term normalization and stemming policies for comparing with the documents in documents collection 110 of FIG. 3. In other words, the technique of projecting the query and tokenizing performs the claimed ***identifying features within each of the plurality of query objects that allow comparison to a body of data stored in a database***. The logic then moves to block 226 where the similarity as ***relative relationships*** is determined by measuring the distance between the query and the documents by using the cosine (Col. 14, lines 28-31) as the step of ***determining relative relationships between each of the plurality of query objects and the body of data***. The top ranked documents in terms of closeness are then returned as best matches to the query (Col. 14, lines 31-34). As shown in FIG. 11, in order to visualize the mining technique, the axes that correspond to a query is generated as user request (Col. 14, line 57-Col. 16, line 3). Assuming the user entered `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines 11-27), a legend is generated for the axes. The legend consists of one or more words attached to one or both directions of the dimension. This indicates to the user that documents near one end of the dimension tend to contain the words at that end or words correlated with those words in the document set (Col. 15, lines 52-59). As shown in FIG. 20 is example of visualization with a plurality of projected points corresponding

to documents with three rays `module`, `fuselage`, and `pounds` having a common origin, and corresponding to the queries, wherein the documents near the end of the ray tend to contain the query word based on the similarity as ***relative relationships*** determined by measuring the distance between the query and the documents. In other words, the technique as discussed performs the claimed ***control an image device to depict points corresponding to data from the database along each of a plurality of rays, wherein positions of the displayed points correspond to the relative relationships, wherein the computer usable code configured to display includes computer usable code configured to display at least a majority of the plurality of rays to have a common origin***. Billheimer does not explicitly teach the technique of ***displaying the plurality of ray as radiating outwardly from the common origin at equally space angle from one another***. However, as disclosed by Billheimer, information visualization is to ensure that the dimensions are orthogonalized if the user desires. Returning to FIG. 20, the three rays `module`, `fuselage`, and `pounds` are chosen for the positive direction will be orthogonalized. And by orthogonalizing, obviously, the three rays are intersected at the right angle at the ***common origin***, and ***radiated outwardly from the common origin at equally space angle from one another***. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer technique by using the orthogonal technique to radiate outwardly the rays in order to represent a result of two different query terms contain in the same document.

Regarding claims 2, 18, 34 and 50, Billheimer teaches all the claim subject matters as discussed in claims 1, 17 and 49, Billheimer further discloses the step of ***placing a small graphic entity at an end of each of the plurality of rays to represent a respective one of the plurality of query objects*** (FIG. 20).

Regarding claims 3 and 19, Billheimer teaches all the claim subject matters as discussed in claims 1 and 17, Billheimer further discloses the step of ***locating the plurality of rays to have a common origin*** (FIG. 20).

Regarding claims 4, 20 and 36, Billheimer teaches all the claim subject matters as discussed in claims 3, 19 and 33, Billheimer does not explicitly discloses the step of ***locating the plurality of rays to radiate outwardly from the common origin at equally-spaced angles from one another***. However, as disclosed by Billheimer, information visualization is to ensure that the dimensions are orthogonalized if the user desires. Returning to FIG. 20, the three rays `module`, `fuselage`, and `pounds` are chosen for the positive direction will be orthogonalized at the common origin. And by orthogonalizing, obviously, the three rays are intersected at the right angle at the common origin, and ***located the rays to radiate outwardly from the common origin at equally space angle from one another***. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer technique by using the orthogonal technique to locate the ray to radiate outwardly in order to represent a result of two different query terms contain in the same document.

Regarding claims 6, 22, 38 and 54, Billheimer teaches all the claim subject matters as discussed in claims 5, 21, 37 and 53, but fails to disclose the step of ***adjusting the critical distance in response to user input***. However, as illustrated by Billheimer, if a user enters `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 will be display. And obviously, if the user enters another terms for querying, the distance will be adjusted according to the cosine measure (Col. 14, lines 10-29). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method by including the step of adjusting the critical distance in order to visualize the result of a query.

Regarding claims 7, 23, 39 and 55, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer does not disclose the step of ***re-determining relative relationships between each of the plurality of query objects and the body of data in response to user input; and rearranging the positions of the displayed points in response to re-determining***. However, as illustrated by Billheimer, if a user enters `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 will be display. And obviously, if the user enters another terms for querying, the relative relationship will be re-determine and the position will be rearranging according to the cosine measure (Col. 14, lines 10-29). Therefore, it would have been obvious for one of ordinary skill in the art

at the time the invention was made to modify the Billheimer method by including the step of re-determining and rearranging in order to visualize the result of a query.

Regarding claims 8, 24, 40 and 56, Billheimer teaches all the claimed subject matters as discussed in claims 1, 17, 39 and 49, Billheimer does not explicitly teach the step of ***deleting an element from the body of data in response to user input; re-determining relative relationships between each of the plurality of query objects and the body of data in response to deleting; and rearranging the positions of the displayed points in response to re-determining***. However, in a document database, a document could be added into or deleted from the database, and obviously, when a document is deleted from the database, for example, any document of FIG. 17, the matrix represents the relationships between the query and the document will be changed, also as in FIG. 20. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer system and method by including the step of deleting and rearranging in order to add in or delete a document from the document database.

Regarding claims 9, 25, 41 and 57, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of ***accessing data corresponding to the occurrence of textual information within a plurality of documents and displaying comprises depicting usage of the textual information within the documents corresponding to portions of the plurality of query objects*** (Col. 15, lines 52-Col. 16).

Regarding claims 11, 27, 43 and 62, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of ***representing each of the plurality of query objects and each datum in the body of data as an n-dimensional vector in an n-dimensional vector space*** (FIG. 20).

Regarding claims 12, 28, 44 and 63, Billheimer teaches all the claim subject matters as discussed in claims 11, 27, 43 and 62, Billheimer further discloses the step of ***calculating a similarity measure between each of the plurality of query objects and each datum of the body of data using some portion of the n-dimensional vectors*** (Col. 14, lines 10-34).

Regarding claims 14, 30, 46 and 59, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of ***displaying points corresponding to data from the database along each of the plurality of rays in a two dimensional display, wherein positions of the displayed points correspond to the relative relationships*** (Col. 15, lines 20-51).

Regarding claims 16, 32, 48 and 61, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of ***breaking elements into subelements; determining relative relationships between each of the plurality of query objects and the subelements; and displaying points corresponding to the***

subelements along each of the plurality of rays, wherein positions of the displayed points correspond to the relative relationships (Col. 10, lines 6-65).

Regarding claim 72, Billheimer teaches all the claim subject matters as discussed above with respect to claim 1, Billheimer further discloses the step of ***inputting the query objects via at least one of user interface by at least one user*** (Col. 15, Lines 28-29).

Regarding claim 73, Billheimer teaches all the claim subject matters as discussed above with respect to claim 1, but does not explicitly teach the step of ***associating the points representing the same specific item and positioned along the different rays with one another***. However, for a document that has terms "apache" and "rotorcraft", and with two queries "apache" and "rotorcraft" as discussed in claim 1, two rays will be provided for "apache" and "rotorcraft", and obviously, there will be two points represent the same document, one will be along the apache ray at a position based on cosine distance, and another point along rotorcraft ray also based on cosine distance as ***associating the points representing the same specific item and positioned along the different rays with one another***. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer technique by displaying two points represent for the same item at two different rays for two queries in order to represent a result of two different query terms contain in the same document.

Regarding claim 74, Billheimer teaches all the claim subject matters as discussed above with respect to claim 73, Billheimer further discloses the step of ***displaying a line coupled with points*** (FIG. 20).

Regarding claim 75, Billheimer teaches all the claim subject matters as discussed above with respect to claim 1, but does not explicitly teach the step of ***simultaneously displaying the points representing the same specific item***. However, for a document that has terms "apache" and "rotorcraft", and with two queries "apache" and "rotorcraft" as discussed in claim 1, two rays will be provided for "apache" and "rotorcraft", and obviously, there will be two points represent the same document, one will be along the apache ray at a position based on cosine distance, and another point along rotorcraft ray also based on cosine distance is displayed simultaneously as ***simultaneously displaying the points representing the same specific item***. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer technique by displaying two points represent for the same item at two different rays for two queries in order to represent a result of two different query terms contain in the same document.

Claims 15, 31, 47 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billheimer et al. [USP 6,611,825 B1], as applied to claims 1, 17, 33, 49, in view of Hazlehust et al. [USP 6,289,353].

Regarding claims 15, 31, 47 and 60, Billheimer teaches all the claimed subject matters as discussed in claim 1, 17, 33 and 49, Billheimer fails to teach the step of ***determining thematic boundaries within each element contained in the database; breaking elements into subelements at the determined thematic boundaries; determining relative relationships between each of the plurality of query objects and the subelements; and displaying points corresponding to the subelements along each of the plurality of rays, wherein positions of the displayed points correspond to the relative relationships***. Hazlehust teaches a method and system for retrieving information by producing a vector space for documents. Hazlehust further discloses the step of ***determining thematic boundaries within each element contained in the database; breaking elements into subelements at the determined thematic boundaries; determining relative relationships between each of the plurality of query objects and the subelements*** (Hazlehust, Col. 4, line 50-Col. 6, line 17). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method and system by determining a thematic boundaries as taught by Hazlehust and displaying the result of a query as in Billheimer FIG. 20 in order to categorize a document database for querying.

Claims 5, 21, 37, 53, 65, 67-68 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billheimer et al. [USP 6,611,825 B1], as applied to claims 1, 17, 33, 49, in view of Herz [USP 6,460,036 B1].

Regarding claims 5, 21, 37 and 53, Billheimer teaches all the claim subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of ***displaying includes locating the plurality of rays to have a common origin and further comprising determining a critical distance from the common origin*** (Billheimer, FIG. 20, Col. 15, lines 52-Col. 16, line 3; Col. 17, lines 24-41). Billheimer fails to disclose the claimed ***points on the plurality of rays falling within the critical distance meet or exceed a relevancy threshold and points on the plurality of rays outside the critical distance do not meet the relevancy threshold***, although as in FIG. 18 is the score to determine the results. Herz teaches a method of clustering target objects. Herz further discloses a threshold distance t for displaying the most interesting objects, wherein t is chosen to be a function of cluster diameter of a cluster C (Herz, Col. 68, lines 36-56). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method and system by applying a threshold as taught by Herz to specify the distance a result document with a query, and by applying the threshold, the displaying of a query's result will be easy to distinguish the closet document that matches with a query.

Regarding claim 65, Billheimer teaches a method, a system, and computer readable medium for representing a document collection (Billheimer, Col. 4, lines 35-48). As shown in FIG. 2 is ***a data processor*** (Billheimer, Col. 8, line 49-Col. 9, line 6). As shown in FIG. 9, a query can be treated as a document, and projected into the same subspace. A query frequency vector is computed by tokenizing the query and applying

the same term normalization and stemming policies that were used on the original collection (Billheimer, Col. 14, lines 10-14). As illustrated at FIGS. 11 and 12, a user interface could be provided to make it easy for the user to select terms for querying (Col. 15, Lines 28-29). As seen, via a user interface for selecting terms, a query with a plurality of terms is projected for tokenizing to identify the features. In other words, the technique of selecting terms for querying performs the claimed ***inputting a plurality of query objects into a data processor***. The logic then moves to block 226 where the similarity is determined by measuring the distance between the query and the documents by using the cosine (Billheimer, Col. 14, lines 28-31) as the step of ***determining relative relationships between each of the plurality of query objects and a body of data***. The top ranked documents in terms of closeness are then returned as best matches to the query (Billheimer, Col. 14, lines 31-34). As shown in FIG. 11, in order to visualize the mining technique, the axes that correspond to a query is generated as user request (Billheimer, Col. 14, line 57-Col. 16, line 3). Assuming the user entered `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Billheimer, Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 performs the claimed ***displaying a point along a plurality of rays for each of the plurality of query objects, wherein positions of the displayed points correspond to the relative relationships between a respective one of the plurality of query objects and the body of data,*** each axe is identified by a query such as `module`, `fuselage`, or `pounds` as ***a small graphic entity at an end of each of the plurality of rays to represent a respective one of the plurality of query objects***. Billheimer further discloses the step of ***determining a critical distance from the common origin*** (Col. 14, lines

10-34). Billheimer does not explicitly teach the technique of ***displaying the plurality of rays to have a common origin and to radiate outwardly from the common origin at equally-spaced angles from one another***, and fails to teach ***points on the plurality of rays falling within the critical distance meet or exceed a relevancy threshold and points on the plurality of rays outside the critical distance do not meet the relevancy threshold***, although as in FIG. 18 is the score to determine the results. However, as disclosed by Billheimer, information visualization is to ensure that the dimensions are orthogonalized if the user desires. Returning to FIG. 20, the three rays `module`, `fuselage`, and `pounds` are chosen for the positive direction will be orthogonalized. And by orthogonalizing, obviously, the three axes as rays are intersected at the right angle at the ***common origin***, and ***radiated outwardly from the common origin at equally space angle from one another***. Herz teaches a method of clustering target objects. Herz further discloses a threshold distance t for displaying the most interesting objects, wherein t is chosen to be a function of cluster diameter of a cluster C (Herz, Col. 68, lines 36-56). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method and system by applying a threshold as taught by Herz to specify the distance a result document with a query, and by applying the threshold, the displaying of a query's result will be narrow down to the closet document that matches with a query.

Regarding claim 67, Billheimer and Herz teaches all the claimed subject matters as discussed in claim 65, Billheimer further discloses the step of ***determining relative***

relationships between each of the plurality of query objects and a body of data stored in a database in the data processor (Billheimer, Col. 14, lines 10-14).

Regarding claim 68, Billheimer and Herz teaches all the claimed subject matters as discussed in claim 65, but does not explicitly disclose the step of ***adjusting the critical distance in response to user input***. However, as illustrated by Billheimer, if a user enters `module`, `fuselage`, and `pounds` as choices for the positive direction of the axes (Col. 18, lines 11-27), the scatterplot visualization as in FIG. 20 will be display. And obviously, if the user enters another terms for querying, the distance will be adjusted according to the cosine measure (Col. 14, lines 10-29). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method by including the step of adjusting the critical distance in order to visualize the result of a query.

Regarding claim 71, Billheimer and Herz teaches all the claimed subject matters as discussed in claim 65, Herz further discloses the step of ***determining a critical distance from the common origin, wherein points on the plurality of rays falling within the critical distance meet or exceed a relevancy threshold and points on the plurality of rays outside the critical distance do not meet the relevancy threshold*** as discussed in claim 65.

Claims 10, 13, 26, 29, 42, 45, 58 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billheimer et al. [USP 6,611,825 B1], as applied to claims 1, 12, 17, 28, 33, 44, 49, 63, in view of Leivian et al [USP 5,897,627].

Regarding claims 10, 26, 42 and 58, Billheimer teaches all the claimed subject matters as discussed in claims 1, 17, 33 and 49, Billheimer further discloses the step of ***organizing data in the database and the plurality of query objects in an n dimensional space*** (FIG. 20). Billheimer fails to teach the step of ***reducing a number n of dimensions in which the data in the database and the plurality of query objects are organized to two dimensions using a Sammon projection***. However, Sammon is a nonlinear projection method to map a high dimensional space onto a space of lower dimensionality as taught by Leivian (Leivian, Col. 3, lines 5-67). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method and system by using the Sammon method as taught by Leivian to map a high dimensional space to a lower dimensionality in order to give more option of displaying to a user.

Regarding claim 13, 29, 45 and 64, Billheimer teaches all the claimed subject matters as discussed in claims 12, 28, 44 and 63, Billheimer further discloses ***the similarity measures between each of the plurality of query objects and the body of data are weighted more heavily than the similarity measures among data within the body of data; and wherein displaying comprises displaying points corresponding to the plurality of query objects and points corresponding to the body of data according to the three or fewer dimensions*** (FIG.

20, Col. 14, lines 10-34). Billheimer fails to teach the step of ***reducing a number n of dimensions in which the body of data and the query objects are represented to three or fewer dimensions using a multi-dimensional scaling method***. Sammon is ***a multi-dimensional scaling method*** to map a high dimensional space onto a space of lower dimensionality as taught by Leivian (Leivian, Col. 3, lines 5-67). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Billheimer method and system by using the Sammon method as taught by Leivian to map a high dimensional space to a lower dimensionality in order to give more option of displaying to a user.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q PHAM whose telephone number is 703-605-4242. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BREENE can be reached on 703-305-9790. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner Hung Pham
January 4, 2005

M. ALI
Primary Examiner